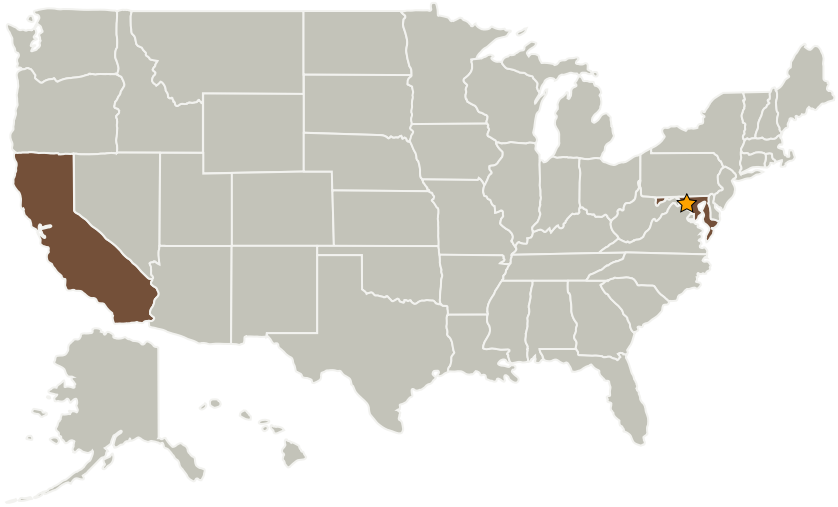
Gamma Detector Modular Assemblies for EXIST, Phase II

Completed Technology Project (2002 - 2004)

Project Introduction

The Energetic X-ray Imaging Survey Telescope (EXIST) is a proposed mission that aims to detect faint high energy X-ray sources in the energy range 10 - 600 keV. The concept for EXIST relies on an X-ray telescope imaging the entire sky each 95 min orbit. The core of the X-ray imaging telescope comprises approximately 8 square meters of pixilated Cd-Zn-Te (CZT) detectors, a technical feat never before attempted. This enormous array requires development of a new packaging technology for CZT detector arrays, one that allows detectors to be abutted together into large arrays of CZT tiles, with minimal dead space in between detectors. Also required is a technology that can produce these detectors with a high interconnection yield, not currently achieved with indium bump technologies. We propose an innovative technique to assemble CZT X-ray sensors avoiding conventional direct indium bump hybridization used today. The novel scheme incorporates commercial off-the-shelf flip-chip and multichip module technologies, combined with new flip-chip bonding materials and proprietary processes developed at Aguila under previous NASA sponsorship. This will result in novel detector modules containing fully-integrated readout electronics that can be implemented into a large-array motherboard.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Aguila Technologies Inc.	Supporting Organization	Industry	SAN MARCOS, California

Primary U.S. Work Locations	
California	Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes